International Journal of Science and Healthcare Research
Vol. 8; Issue: 4; Oct.-Dec. 2023
Website: ijshr.com
Original Research Article *ISSN: 2455-7587*

Pervasive Uncertainty: Citizens' Perspective on the Efficacy of Healthcare Services in Combating Vaccine Reluctance; A Structural Equation Modelling (SEM) Approach

R Mallieswari[1], Urs Gururaj B[2], Mishra Niharika[3], P Bhanumathi[4]

[1]Asst. Professor, Department of Business Analytics and Data Sciences, MS Ramaiah Institute of Management, Bengaluru
[2]Professor, Department of Organizational Behavior and Human Resources, MS Ramaiah Institute of Management, Bengaluru
[3]Asst. Professor, Department of Marketing, MS Ramaiah Institute of Management, Bengaluru
[4]Associate Professor, Department of Organizational Behavior and Human Resources, MS Ramaiah Institute of Management, Bengaluru

Corresponding Author: Mallieswari R

DOI: https://doi.org/10.52403/ijshr.20230402

ABSTRACT

Nations around the world have conducted huge COVID-19 vaccination programmes; however, certain groups of individuals are resistant to the vaccine. Despite its demonstrated effectiveness, the general public is beginning to view vaccination as harmful and pointless. During 2020, the COVID-19 pandemic, plunged the globe, killing tens of thousands of people and halting commerce all across the planet. Scientists from every continent in the world worked together to develop vaccinations to halt the spread of the deadly virus. Even as efforts are made to eradicate the pandemic through vaccination campaigns, the COVID-19 "infodemic" continues to weaken public faith in these efforts. Although vaccine skepticism is a major problem, it is not usually the result of a flawed information ecosystem or defective vaccinations. The purpose of this study was to evaluate the incidence of COVID-19 vaccine hesitation in India and identify pertinent healthcare service-oriented factors contributing to this hesitancy. In order to investigate the prevalence of COVID-19 vaccine reluctance in India, a meta-analysis was conducted. In total, 305 respondents from Bangalore, India, were contacted via mail survey to collect the information required to assess the aforementioned objective. The Structural Equation Modeling (SEM) method was used to assess the many causes of vaccine hesitancy in healthcare services.

Keywords: Covid-19, vaccination, hesitancy, healthcare services, Information services

INTRODUCTION

During the recent couple of decades, vaccine hesitancy has gone on to become a public health concern of magnifying proportions, thus becoming a challenge and a threat, to healthcare workers and their services all over the world. Nevertheless, vaccinations have displayed and proved to be one of the most effective preventative therapies against infectious and other forms of diseases. In this regard, the widespread vaccine hesitancy has gone to impede efforts to achieve immunization coverage and thus be able to curb the spread of infectious disease/s. Complacency, convenience, and confidence are three factors that can influence the perspective of an individual getting

themselves inoculated. To be "complacent" means that "an inaccurate assessment of the risk posed by a disease" is built up in an individual; thus making the vaccine taking deemed unnecessary (McDonald, 2015). The term "confidence" refers two aspects, one is the belief that vaccinations are safe and effective; secondly, the faith in the skills and abilities of healthcare professionals. Lastly, vaccines need to be made available, reasonably priced, and administered in an environment that is relaxing and stress-free to be labelled "convenient" (Sage, 2020). This issue is influenced by a complexity of social, psychological, cultural, and political variables, contributing to the widespread doubt around vaccination, not just in India and but elsewhere in the world too.

Healthcare infrastructure and its services

In order to effectively build strategies is to address this crucial problem, it is essential to gain an understanding of the citizen's perspective on the effectiveness of healthcare services in overcoming various levels of vaccine resistance. It is possible for healthcare workers and practitioners, politicians, and civil society groups to strategically devise targeted interventions that increase vaccine uptake, boost trust in healthcare institutions and thus enhance overall Public Health care outcomes and this can be done by exploring and working around the varied perspectives and concerns held by individual and the community at large. The immunization efforts began in New Delhi on 16th January 2021, in India, to stop the Coronavirus from becoming a pandemic. By October 21, 2021, 1 billion vaccine doses had been administered to the country's population overall and this number is increasing rapidly.

This accomplishment has been made possible by the coordinated efforts of Governmental organizations, vaccine producers, healthcare providers, mental health specialists, and immunized citizens. These figures were made possible by India's national-scale mass immunization programme experience, as well as the involvement of the public, private, and voluntary sectors (Bagcchi, 2021). The development of vaccines has happened incredibly quickly. The development of vaccines in China, India, and Russia has led to their widespread distribution (Tandon, 2021).

Comorbidity issues

The general Indian population people have experienced a variety of mental health problems, including reluctance, fear of side effects, vaccine access concerns, stigma, and misinformation. Due to doubts about the vaccine's efficiency, even medical professionals in India have reported having a poor opinion of it in the early stages of the vaccination effort (Velumani, Arpita and Balaram, 2021). The widespread anti vaccine movement and the idea that COVID-19 does not exist were the main causes of the first lackluster impetus of vaccination in India (Samarasekera, 2021; Ransing *et al*., 2021). There was some doubt about the vaccine's safety among those who were willing to get it (Dodd *et al*., 2021). Mental health professionals have contributed to public health education and promotion in addition to addressing the increasing psychiatric morbidity brought on by Covid - 19 and its neuropsychiatric aftereffects (Banerjee, *et al.*, 2021; Brewer & Abad 2021).

REVIEW OF LITERATURE

The review of literature has been split into two major areas. The first area is about the vaccine hesitancy and the second is regarding the preventive measures. Shrivastwa *et al*., (2015) studied the various predictors of vaccination across India for children between 12 to 36 months of age. The survey data was collected from the district-level households to know and categorize non-vaccinated or under-vaccinated based on the UIP-recommendation vaccine. The study found that immunization acceptance among children was little. Public

health programs will address these non and under-vaccinated rates on religion, caste, wealth, and education. Mathew & Mittal., (2021) emphasized that vaccination inequity usually echoes differences in vaccination handling within a community. According to the study, despite being eligible, injustice occurs when some infants, children, or adults do not get the vaccination as required. The findings have given the researcher the way forward regarding infectious diseases that should be the primary driver for vaccination policy decisions.

Jin *et al.,* (2021) studied the communication strategies to combat COVID-19 vaccination. Because of COVID-19, the WHO planned mass vaccination campaigns globally. The study attempted to discover the possible effects of various communication strategies. The study's findings propose new strategic acumens for global health establishments and vaccine supporters to proactively address the declining people's readiness to uptake the COVID-19 vaccine. Chandani *et al.,* (2021) study was on COVID-19 vaccination hesitancy across India. The study was online by administering the multi-item authenticated questionnaire among Indian adults. The study focused on concerns, willingness about vaccination, and their sociodemographic characteristics. The study statistically proved vaccine awareness and acceptability based on the acquired educational qualification, employment status, age, etc., The study concluded that most Indians would accept the vaccine and its awareness program, so COVID -10 vaccinations must be planned and implemented continually. Nayar, *et al.,* (2022) research objective was to study how India has recently experienced considerable growth in the coverage of routine childhood vaccines. The study was because many vaccines are not delivered promptly, i.e., at the recommended age. Further, the focus was on the disparities in coverage and timeliness across states and at the national level. The study concluded that many children in India would not receive vaccines at the recommended age, exposing them to vaccine-preventable diseases. The study suggested interventions that explicitly emphasize improving the timely delivery of the proper vaccines needed for children and adults to improve the overall efficacy of the routine vaccination program.

Waheed *et al.,* (2022) studied the determinants of coronavirus disease 2019: vaccine acceptance, barriers, and hesitancy of healthcare employees. The research focused on knowing the frequency and the various determinants of the COVID-19 vaccine. The main block to vaccine acceptance was the lack of trust in governmental policies. Effectiveness and safety were the two determinants for the approval of vaccines. The study suggested establishing an observation system for the side effects of COVID and communicating these details with HCWs to reduce the tension and worries and increase the vaccine uptake. Piltch-Loeb *et al.,* (2021) emphasized hesitancy toward the COVID-19 vaccine. The study depicted that the communication channels TV, newspapers, and local newspapers had influenced people's acceptance of vaccines. The research suggested using social media platforms to educate people to increase vaccine acceptance.

Fuady *et al.,* (2021) study assesses several situations of distributing the vaccine to the people of Indonesia. There was a lack of strategy, fewer vaccines, and lesser capacity in healthcare, especially in low and middle-income countries. The efforts to be towards designing the vaccination programs, enhance the ability of healthcare, to make available the vaccines needed for optimum protection of people across countries. Maharlouei *et al.,* (2022) focused on the vaccination that could end the COVID-19 pandemic and its impact on creating sound public health. The study was to understand the reasons for rejecting immunization. The worry about vaccine efficacy and side effects among individuals are reasons for vaccination reluctance. Public

health can be improvised by emphasizing mass education. Abebe *et al*., (2021) investigated the attitude, knowledge, acceptance level and the various determinants of Covid-19 vaccine acceptance among Ethiopia's adult population. This study resulted from the huge challenge of accepting the vaccine in multiple countries in Ethiopia. Education and the government's awareness are crucial in reducing the negative mindset and attitude toward COVID-19 vaccination.

In view of the foregoing, the following Research Objectives are set for this study:

- Ascertain the factors impacting the Covid-19 vaccination hesitancy among the citizens.
- Examine the most contributing factor that could change the citizen's perspective on vaccination.

Conceptual framework

Figure 1 depicts the conceptual model studied in this work. A behaviour-oriented method and a cognitive-based perspective has been developed to investigate the most important component that could affect the citizen's perception of vaccination. Learning the risk perception of the public through personal assistance, hospital facilities, and attention to patients on the trust component of vaccine aversion is being examined at both the vaccination administration process and the implementing authority levels.

Flow Chart No 1: Conceptual Framework

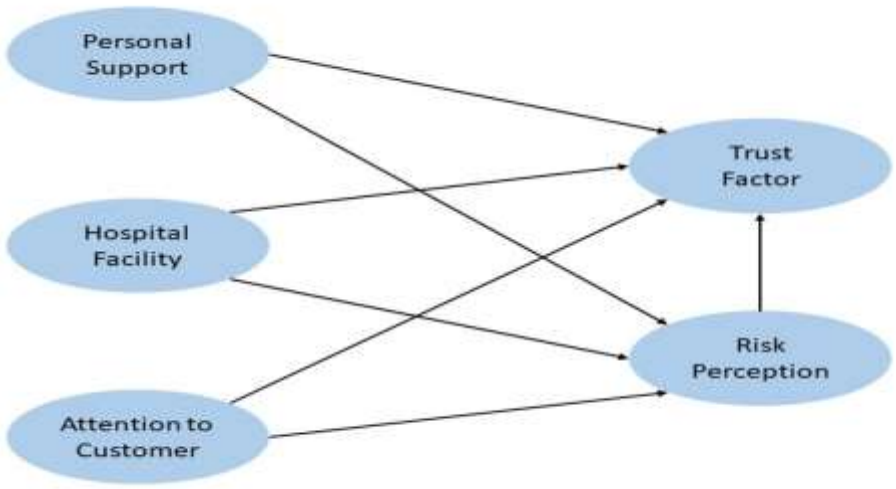


Table No 1: Showing the variables understudy

Independent Variable(s)	Dependent Variable(s)	Controlling/Extraneous Variable(s)
Personal Support Hospital Facility Attention to Customer	Trust Factor	Risk Perception

METHODOLOGY

Exploratory and descriptive research were used in this study to achieve its goals. The preceding investigations fell short of identifying the causes of vaccine reluctance. Both primary and secondary data were used in this investigation. Secondary data was gathered through various research articles, publications, and books, while primary data was gathered using a self-developed questionnaire. The current study's objective sample size was 389. A one-on-one interview with 305 respondents was done. The general population that had not received the

vaccination, despite having a duty or responsibility to society to stop the spread of the contagious disease, served as the study's respondents. Conveniently, these samples were chosen from diverse areas of Bangalore, India. Data was cleaned, processed, and entered into SPSS AMOS for additional analysis after data collection. The KMO and Bartlett's test values were examined as part of the reliability test. Then, in order to quantify how well healthcare services contribute to overcoming vaccine hesitancy, structural equation modelling was employed.

Data Analysis

The main goal of this study is to determine what influences people's hesitation to get vaccinated against COVID-19 and what elements are most likely to modify that perception. Using KMO and Bartlett's test, the sampling's dependability was evaluated.

In order to investigate the relationship between the variables under research, structural equation modelling was used.

Hypothesis:

Healthcare service quality factors positively impact the trust and risk perception of vaccine hesitancy among the citizens.

Factors pertaining to healthcare service quality, such as personal support, hospital facilities, and attention to the customer, have a p-value 0.05 (standard value of significance). Thus, we can conclude that there is a strong association between healthcare service quality and vaccine hesitancy.

Table No 3: Variables' reliability and validity tests - KMO (Kaiser-Meyer-Olkin)

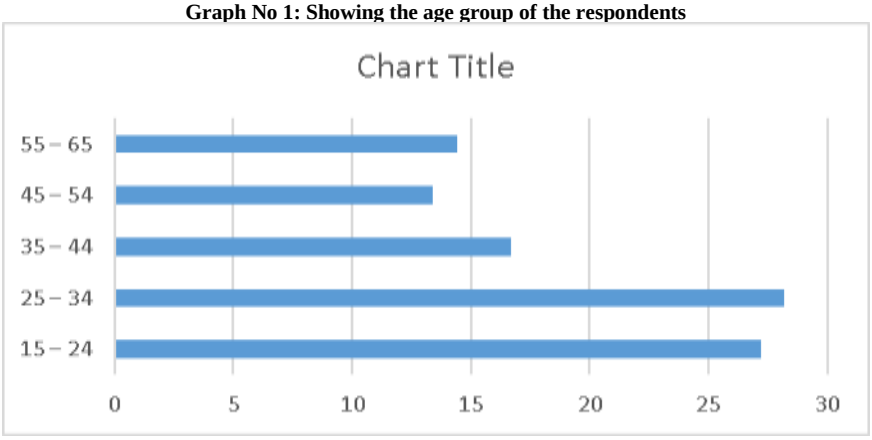
Variables	KMO and Bartlett's Test	Results
Personal Support	0.799	Valid
Hospital Facility	0.802	Valid
Attention to Customer	0.911	Valid
Trust factor	0.899	Valid
Risk perception	0.834	Valid

Data visualization: Demographic profile

Table No 4: Age groups of the respondents

Class Interval	Frequency	Percent
15 – 24	83	27.2
25 – 34	86	28.2
35 – 44	51	16.7
45 – 54	41	13.4
55 – 65	44	14.4
Total	305	100.0

Graph No 1: Showing the age group of the respondents



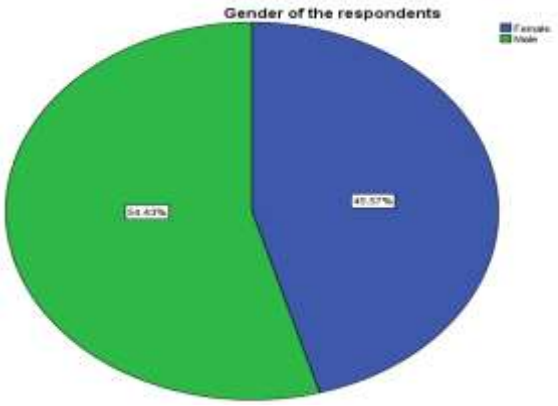
Inference:

The age group of 25 to 34 years constitute the largest among the age groups with 28% of the respondents; followed by 15 to 24 years at 27%. These were followed by age groups of 35 to 44 years with 17%, 55 to 65 years with 14% and the least being the age group of 45 to 54 years with 13% respectively.

Table No 5: Gender of the respondents

Gender	Frequency	Percent
Female	139	45.6
Male	166	54.4
Total	305	100.0

Graph No 2: Showing the gender of the respondents

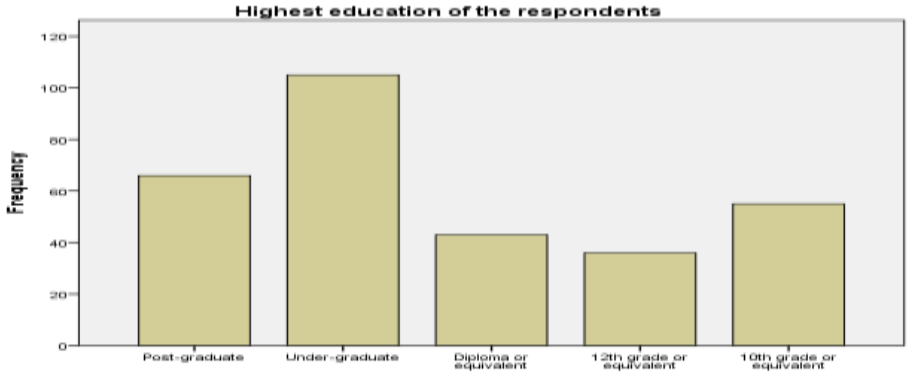


Inference

The number of male respondents were more at 54% in comparison with the female respondents at 46%.

Table No 6: Showing the level of education among the respondents		
Level of Education	**Frequency**	**Percent**
Post-graduate	66	21.6
Under-graduate	105	34.4
Diploma or equivalent	43	14.1
12th grade or equivalent	36	11.8
10th grade or equivalent	55	18.0
Total	305	100.0

Graph No 3: Showing the education levels of the respondents



Inference

Respondents with an Under-graduate degree were the highest in number with 34%; followed by Post-graduates with 22%; 10th standard with 18%, Diploma holders with 14% followed by 12th Standard with 12%.

Flow Chart No 2: The Measurement model of the study

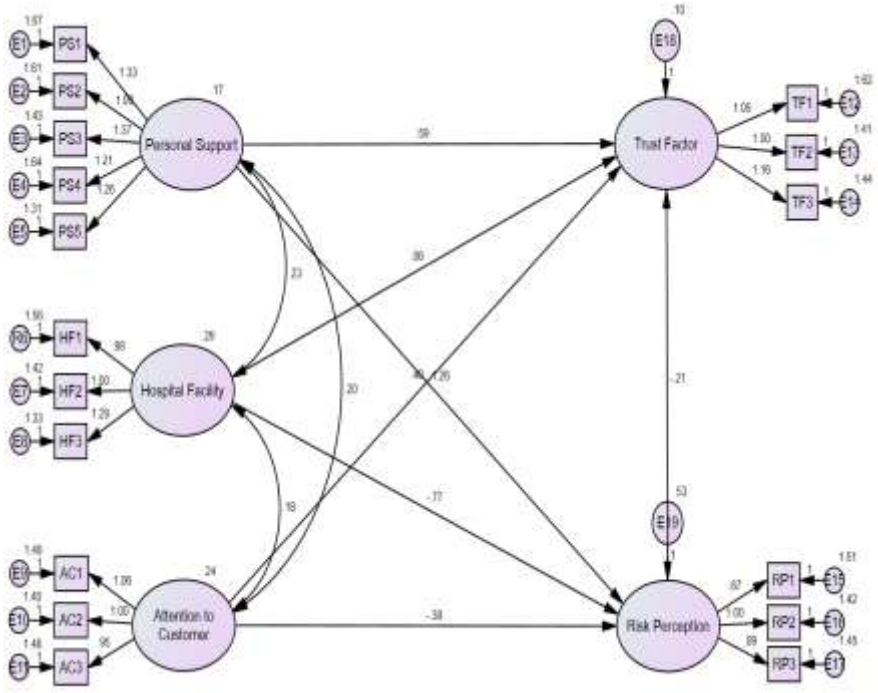


Table No 7: The values of the Chi-square, Goodness of Fit and Root Mean Square Error

Index	Shorthand	Value found to be	Acceptable Fit if Data is	Is accepted as fit
Chi-square/df	CMIN/DF	1.492	≤ 5.0	Yes
Goodness of Fit Index	GFI	0.952	≥ 0.95	Yes
Root Mean Square Error Approximation	RMSEA	0.04	≤ 0.06	Yes

Inference

Comparing the tabulated data with the acceptable fit data, we can say that the model is considered fit as it clears all the critical parameter values.

Table No 8: Hypothesis Testing of Personal Support

			Estimate	S.E.	C.R.	P
PS1	<---	Personal_Support	.972	.205	4.755	***
PS2	<---	Personal_Support	.729	.180	4.046	***
PS3	<---	Personal_Support	1.000			
PS4	<---	Personal_Support	.882	.195	4.532	***
PS5	<---	Personal_Support	.918	.186	4.924	***

Interpretation: From the table, the p-value(s) are found to be ≤ 0.001.

Table No 9: Hypothesis Testing of the Hospital Facility

			Estimate	S.E.	C.R.	P
HF1	<---	Hospital_Facility	.985	.229	4.306	***
HF2	<---	Hospital_Facility	1.000			
HF3	<---	Hospital_Facility	1.289	.260	4.949	***

Interpretation: From the table, the p-value(s) are found to be ≤ 0.001.

Table No 10: Hypothesis testing of Attention to Customer

			Estimate	S.E.	C.R.	P
AC1	<---	Attention_to_Customer	1.059	.269	3.930	***

			Estimate	S.E.	C.R.	P
AC2	<---	Attention_to_Customer	1.000			
AC3	<---	Attention_to_Customer	.949	.254	3.735	***

Interpretation: From the table, the p-value(s) are found to be ≤ 0.001.

Table No 11: Hypothesis Testing of Risk Perception

			Estimate	S.E.	C.R.	P
RP1	<---	Risk_Perception	.885	.283	3.121	.002
RP2	<---	Risk_Perception	1.000			
RP3	<---	Risk_Perception	.904	.291	3.111	.002

Interpretation: From the table, the p-value(s) are found to be 0.002.

Inference:

- The level of significance (p-value) for the Healthcare Service Quality Factor – Personal Support is ≤ 0.05, we consider the factor significant.
- The level of significance (p-value) for the Healthcare Service Quality Factor – Hospital Facility is ≤ 0.05, we consider the factor significant.
- The level of significance (p-value) for the Healthcare Service Quality Factor – Attention to Customer is ≤ 0.05, we consider the factor significant.
- The level of significance (p-value) for the Risk Perception is ≤ 0.05, we consider the factor significant.

Findings

In this study, we examined the vaccine resistance, individually and in conjunction with healthcare services. We have identified the variables that might have an impact on people's hesitation and quantified their relative contributions to the overall study. The elements that we deduced from our research are those that have a direct bearing on COVID-19 immunization reluctance. Specifically, we discovered that the citizen's interest was considered, the healthcare staff were courteous, and the availability of healthcare professionals at all times, all of these had a significant impact on the citizen's reluctance to receive the immunization. Unwillingness to receive the immunization on the citizen's part, was significantly influenced by factors related to the healthcare institution, such as aesthetically pleasing facilities, a desire to address citizens' concerns, and the healthcare service provider's propensity to do the right thing the first time.

Citizen-focused characteristics, such as healthcare service providers who earned your trust and paid close attention to you, had a significant impact on vaccine resistance. Risk perception considerations, including the fact that the vaccine was still in the trial phase and that many individuals were worried about unfavorable side effects, contracting infectious diseases, and so on. Therefore, risk perception is one of the factors affecting vaccination aversion among the citizens.

The study shows that factors with a direct impact on citizens were those that contributed the most. The characteristics that significantly relate to staff members are engagement, attention, friendliness, and interest in helping citizens with their difficulties. Another important factor was the citizen's perception about the clinics and hospitals. If the healthcare provider came off as more professional, citizens may be more likely to consider getting the vaccination. This could be in the form of being better equipped with better facilities or having confidence in trying situations among the various healthcare service providers.

CONCLUSION

To conclude, the purpose of this study was to identify and evaluate the COVID-19 vaccine hesitation along with pertinent healthcare service-oriented factors, contributed to this hesitancy, as there were less studies conducted in the Indian scenario. The healthcare service providers availability, professionally courteous behavior like engagement, attention and friendliness, which earns the trust along with the propensity of the healthcare professionals to do the right thing and persevering focus on the citizen centric issue/s, coupled with the presence of aesthetic infrastructure and services, contributed significantly on the citizen's vaccine reluctance. Vaccine aversion, i.e., the considerations of the risk involved include the ongoing vaccine trails along with the unfavorable side effects and contracting infectious diseases, were the on the top of the citizen's concerns. Healthcare providers must focus their energies on building the strengths and competencies of their various personnel, in order to overcome these issues, which ensures higher level of vaccine acceptance, better herd immunity and thus reduce the chances of an Covid-19 endemic in the near future amongst our citizens.

Declaration by Authors

Acknowledgement: None
Source of Funding: None
Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Abebe, H., Shitu, S., & Mose, A. (2021). Understanding of COVID-19 vaccine knowledge, attitude, acceptance, and determinates of COVID-19 vaccine acceptance among adult population in Ethiopia. *Infection and Drug Resistance*, Jun 1;14:2015-2025. doi: 10.2147/IDR.S312116. eCollection 2021.
2. Banerjee D., Mukhopadhyay S., Asmeen M.S., Javed A. (2021). COVID-19 vaccination: crucial roles and opportunities for the mental health professionals. *Glob. Ment. Health (Camb).*2021; 8: e25. Published online 2021 Jun 25. doi: 10.1017/gmh.2021.25
3. Brewer N.T., Abad N. (2021) and Abad, Neetu (2021). Ways that mental health professionals can encourage COVID-19 vaccination. JAMA Psychiatry. 78(12):1301-1302. doi:10.1001/jamapsychiatry.2021.2951
4. Chandani, S., Jani, D., Sahu, P. K., Kataria, U., Suryawanshi, S., Khubchandani, J., & Sharma, D. (2021). COVID-19 vaccination hesitancy in India: State of the nation and priorities for research. *Brain, behavior, & immunity-health*, *18*, 100375
5. Dodd R., Cvejic E., Bonner C., Pickles K., McCaffery K.J. (2021). Sydney Health Literacy Lab COVID-19 group 2020 Willingness to vaccinate against COVID-19 in Australia. *Lancet Infect. Dis*. Mar; 21(3): 318–319. Published online 2020 Jun 30. doi: 10.1016/S1473-3099(20)30559-4
6. Fuady, A., Nuraini, N., Sukandar, K. K., & Lestari, B. W. (2021). Targeted vaccine allocation could increase the COVID-19 vaccine benefits amidst its lack of availability: A mathematical modeling study in Indonesia. *Vaccines*, 9(5), 462.
7. Jin, Q., Raza, S. H., Yousaf, M., Zaman, U., & Siang, J. M. L. D. (2021). Can communication strategies combat COVID-19 vaccine hesitancy with trade-off between public service messages and public skepticism? Experimental evidence from Pakistan. *Vaccines*, *9*(7), 757.
8. Mathew, J. L., & Mittal, S. K. (2021). Vaccination inequities in India: current status and the way forward. *American Journal of Preventive Medicine*, *60*(1), S4-S10.
9. MacDonald N.E., Sage Working Group on Vaccine Hesitancy Vaccine hesitancy: Definition, scope and determinants. Vaccine. 2015; 33:4161–4164. doi: 10.1016/j.vaccine.2015.04.036. [PubMed] [CrossRef] [Google Scholar]
10. Nayar, R., Pattath, B., Mantha, N., Debnath, S., & Deo, S. (2022). Routine childhood vaccination in India from 2005–2006 to 2015–2016: Temporal trends and geographic variation. *Vaccine*, *40*(48), 6924-6930.

11. Piltch-Loeb, R., Savoia, E., Goldberg, B., Hughes, B., Verhey, T., Kayyem, J., & Testa, M. (2021). Examining the effect of information channel on COVID-19 vaccine acceptance. *Plos one*, *16*(5), e0251095.
12. Ransing R., Dashi E., Rehman S., Chepure A., Mehta V., Kundadak G.K. (2021). COVID-19 anti-vaccine movement and mental health: challenges and the way forward. *Asian J. Psychiatry*. Apr; 58: 102614. Published online 2021 Feb 23. doi: 10.1016/j.ajp.2021.102614
13. SAGE Working Group on Vaccine Hesitancy Report of the SAGE Working Group on Vaccine Hesitancy. [(accessed on 26 December 2020)]; Available online: https://www.who.int/immunization/sage/meetings/2014/october/1_Report_WORKING_GROUP_vaccine_hesitancy_final.pdf
14. Samarasekera U. (2021). Feelings towards COVID-19 vaccination in Africa. *Lancet Infect. Dis*. Mar;21(3):324. doi: 10.1016/S1473-3099(21)00082-7.
15. Shrivastwa, N., Gillespie, B. W., Kolenic, G. E., Lepkowski, J. M., & Boulton, M. L. (2015). Predictors of vaccination in India for children aged 12–36 months. *American Journal of Preventive Medicine*, *49*(6), S435-S444.
16. Tandon Rajeev. (2021). The bitter lessons of COVID-19: Acknowledging and working through many points of tension. *Asian J Psychiatr*. Jan; 55: 102545. Published online 2021 Jan 5. doi: 10.1016/j.ajp.2021.102545
17. Velumani S., Arpita P., Balaraman R. (2021). Attitude toward COVID-19 vaccination: a cross-sectional study on healthcare professionals. Indian J. Pharmacol. Letter to Editor. 53 (3), 250-251
18. Waheed, A., Abu Bakr Elsaid, N. M., Ghweeba, M., Elmaraghy, N., Al-Touny, S. A., Nemr, N., & Aly, H. M. (2022). Determinants of coronavirus disease 2019 vaccine acceptance, hesitancy, and barriers among healthcare workers in Ismailia, Egypt: a mixed methods study. *Journal of the Egyptian Public Health Association*, *97*(1), 1-13.

How to cite this article: R Mallieswari, Urs Gururaj B, Mishra Niharika, P Bhanumathi. Pervasive uncertainty: citizens' perspective on the efficacy of healthcare services in combating vaccine reluctance; a structural equation modelling (SEM) approach. *International Journal of Science & Healthcare Research.* 2023; 8(4): 8-17. DOI: *https://doi.org/10.52403/ijshr.20230402*

******